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AUTHOR Palumbo, George; Sacks, Seymour
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The differential interest costs to rural governments associated with borrowing in the tax-exempt bond market is a function of the advantageous position of several large partially rural counties and the dominance of school district borrowing in rural communities, rather than a disadvantage of predominantly rural governments. This conclusion is the result of a number of regression equations estimated from a unique 1982 data set that combines socioeconomic, financial, and governmental information. Of primary importance to rural development policymakers and practitioners is that highly rural governments paid rates roughly equivalent to the most urban borrowers on publicly offered debt issued during 1982. Suburban governments benefitted from lower interest rates than others on general obligation (GO) bonds sold by nonschool governments, but they had no comparative advantage in issuing revenue bonds or school bonds. Nonschool governments located outside metropolitan areas, as a group, paid lower rates than did their metropolitan counterparts on GO bond issues. Like suburban issuers, nonmetropolitan issuers did not enjoy the same savings on their revenue and school bond sales. Rural governments were as successful in selling long-term municipal bonds as were urban governments during the volatile market of 1982. Rural interest rates were comparable to rates paid by urban issuers. (JHZ)

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Rural Governments in the Municipal Bond Market

George Palumbo
Seymour Sacks

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RURAL GOVERNMENTS IN THE MUNICIPAL BOND MARKET. By George Palumbo and Seymour Sacks, Agriculture and Rural Economy Division, Economic Research Service, U.S. Department of Agriculture. Staff Report No. AGES870510.

ABSTRACT

Suburban-type governments paid the lowest interest rates on long-term bonds sold in 1982, holding bond characteristics constant, while totally urban and highly rural governments paid rates roughly equal to each other. Using 1982 municipal bond sales data matched with 1980 Census of Population data, this report examines the characteristics of municipal bonds categorized according to the rural percentage of the issuing government's population. Few instances of a simple linear relationship between key bond variables and rurality were found.

Keywords: Municipal bonds, local government finance, rural government borrowing, tax-exempt securities.

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Rural Governments in the Municipal Bond Market

George Palumbo
Seymour Sacks

INTRODUCTION

This report describes emerging trends in credit ratings and borrowing practices in the tax-exempt bond market, and assesses their effect on rural governments.1/ The objectives of this report are to ascertain trends in the composition of the municipal bond market in a way that reveals the degree to which rural governments' access to regional and national credit markets has been affected. Special emphasis is placed on variations in the cost of debt financing among governments categorized by degree of rurality.

Using a unique data base created for this research project, we analyze data on long-term bonds issued for public purposes by local governments during 1982. Borrowing activity in 1982 is particularly important as that year marked the emergence of a number of new financing techniques, often referred to as creative financing, which may have permanently changed the municipal bond market.

In addition to fundamental changes in the municipal bond market, local governments over the last decade have undergone a number of changes in their relationships with both the Federal Government and their respective State governments. The combination of tax reform, the realignment of functional responsibility, and a fairly severe economic recession in the early eighties placed fiscal constraints on many local governments that often limited their access to credit markets. When these changes are placed in the context of the ongoing deregulation of financial institutions and a bond market that was displaying record-high interest rates and was being sensitized to the presence of default risk by the Washington Public Power Supply System's repayment problems, it is easy to understand why the municipal bond market of 1982 was different from that of the seventies. As Feldstein points out, the municipal bond market in the eighties has been marked by an increase in

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1/ The terms "municipal bonds" and "tax-exempt bonds" are used interchangeably throughout this report. Securities issued or guaranteed by States, their political subdivisions, agencies, or instrumentalities are referred to as municipal bonds if their interest is exempt from Federal income tax. This report deals exclusively with long-term bonds issued for public purposes by local governments.

volume and interest rate volatility, more diverse bond and note structures, and a greater involvement by retail investors than had been the case in the previous two decades (3).2/ This is a market in which various credit enhancement practices are increasingly important, as are financing techniques which offer greater flexibility to bondholders.

These changes in the bond market have forced our analysis of rural government borrowing costs to proceed in a manner somewhat different from that adopted in earlier studies.3/ Rural governments do not operate in a vacuum, removed from their fiscal, economic, and political environments. Nor do rural governments, even those sharing similar environments, form a homogeneous group. To better understand borrowing patterns among rural governments, we first must understand patterns within the municipal bond market as a whole and regional and State-specific variations within this market. Only in this way can the changing circumstances of rural governments be seen in their proper context.

DESCRIPTION OF THE DATA

To understand the relative advantages or disadvantages of rural governments in the municipal credit market, an analytical data base has been prepared that reflects the interest cost of funds for like instruments and risks. The Public Securities Association's (PSA) long-term municipal bond file for calendar year 1982 was the basic source of information on bond issue characteristics. This data includes the amount of each bond issue, date of sale, the type of sale, the number of bids received on competitively awarded issues, the issue's credit ratings, the presence of credit enhancements, the term structure of the issue, the uses for which the bonds were issued, and the interest cost of the issue.

The characteristics of the long-term, tax-exempt bonds issued in 1982 were cataloged by the PSA based on information collected from the financial press and PSA members. This compilation of issues was checked against other information sources and modified by the U.S. Department of Agriculture and the authors to reflect the identity of each issuer (using the government codes assigned by the Census Bureau's Governments Division).4/ The government identifier was then used to merge socioeconomic data from the 1980 Census of Population and governmental structure information from the 1982

2/ For a description of the rural municipal bond market as it existed in 1977, see (12). Underscored numbers in parentheses refer to items listed in the references section.

3/ Examples of earlier studies of rural or small government borrowing costs include (9, 10, and 13).

4/ Information from the Bond Buyer, Moody's Investors Service, Inc., and the 1982 Census of Governments was used to verify and/or supplement the bond issue information contained in the PSA data file. Socioeconomic data from the 1980 Census of Population, governmental structure information from the 1982 Census of Governments, and bond market indices were also merged into the data base.

Census of Governments into the file. All private-purpose bonds included in the PSA data file were purged.5/

While the resulting data base represents the most complete and accurate data available on State and local government public-purpose borrowing during 1982, several shortcomings remain. The emergence of several alternatives to fixed-rate municipal bonds in the late seventies and early eighties makes any empirical analysis of the risk-adjusted cost of borrowing difficult with available data. The PSA file reports an interest rate variable (generally an average interest rate rather than the true interest cost (TIC) of debt financing) but does not attempt to measure risk sharing by the issuing government. And, while certain credit enhancements (such as private insurance) are coded, the cost of these enhancements to the issuer remains unknown. Thus, the measure of local government borrowing costs used in this report is far from perfect.

In addition, the PSA data set has additional shortcomings which could distort observed patterns of rural government borrowing. First, the PSA's coverage of privately placed bonds is not nearly as complete as its coverage of bonds sold through an underwriter. State regulations often require larger bond issues to be sold through competitive bidding, so most of the dollar volume of borrowing is captured in the PSA's data base. Small issues however, can often be sold directly to local investors and are less likely to get reported to the PSA. As a result, we do not know how many bond issues, particularly those of small rural governments, are not covered in this analysis.

Second, the PSA data do not report the interest rate subsidies going to those issues that received the poverty level, intermediate level, or market level of support from the Farmers Home Administration (FmHA). This shortcoming cannot be adequately addressed with the available information. Since FmHA support is more likely to go to rural borrowers, the subsidized interest rate these issuers receive could distort the analysis of borrowing costs.

The local government municipal bond market will be described in the remainder of this report in terms of the distribution of bond issues with particular characteristics. The reason the number of issues, rather than the dollar value of issues, is the focus of our attention is that we are interested in presenting data on the "typical bond issue" rather than on the largest issues being sold. One minor problem with this interpretation is that many multiple issues the PSA recorded are individual elements of serial bonds. An inspection of the entire PSA listing for 1982 revealed many governments selling a number of bonds in varying denominations on the same day. In contrast, if the issues were rated together, Moody's Investors Service, a major bond rating firm, often recorded the sale of only one issue, equal to the sum of the PSA's individual issues. Because of technical considerations, we treated the PSA format as the primary source.

5/ For the purposes of this report, public-purpose bond issues are those which would be rated by the governments section of Moody's Investors Service. That is, public-purpose bonds are those whose creditworthiness is based primarily on the financial characteristics of the issuer rather than on the financial viability of private enterprises using the bond's proceeds. This concept of "public" includes many bond issues which others would consider "private."

BOND MARKET CHARACTERISTICS

In 1982, the municipal bond market was in the midst of long-term restructuring and reacting to shorter term fluctuations in financial market conditions. Between 1975 and 1984, the nature of the tax-exempt bond market changed dramatically. In 1975, general obligation (GO) issues accounted for 51 percent of the municipal bond market, in 1982 these issues made up approximately 30 percent of the dollar volume of tax exempt bonds, and by 1984 they were only 27 percent of total market volume.6/ Similarily, the manner in which these bonds were brought to market has changed. In 1975, 60 percent of the total dollar volume of bonds was placed with underwriters through competitive bidding rather than negotiated placements. By 1982, that proportion had diminished to 28 percent, and in 1984 competitive bidding was used for only 22 percent of the total value of the bonds issued (2).

The change in the relative importance of GO bonds compared with revenue bonds is due, in large part, to the increasing incidence of public borrowing for private purposes during this period. According to the Advisory Commission on Intergovernmental Relations, in 1970 traditional public-purpose borrowing for the construction of public facilities accounted for 95 percent of all revenue bond issues (1). By 1982, public borrowing for private purposes, generally industrial development and housing bonds, was responsible for 55 percent of the value of all revenue bonds issued. The growing use of the tax-exempt bond market for nongovernmental borrowing has led to proposed and implemented changes in the tax laws governing the market. The growth in importance of industrial development bonds, environment and pollution control bonds, and mortgage revenue bonds means that the traditional public-purpose bonds analyzed in this report have accounted for an increasingly smaller portion of the total tax-exempt market. This pattern seems certain to be reversed in the near future with the enactment of increasingly restrictive limits on tax-exempt, private-purpose debt.

In addition to these long-term trends, the municipal bond market reflected volatile financial market conditions at the beginning of the decade. In response to record high interest rates, the growing number of private-purpose borrowers in the tax-exempt market, and waning demand for fixed-rate securities, State and local governments were turning to various creative financing techniques to lure more investors into the market. Variable rate bonds, zero and compound coupon bonds, bonds with put provisions and warrants, and bonds with various types of credit enhancements were being issued in record numbers at the beginning of the decade.7/ Most of these new financing techniques required the issuer to shoulder some of the market risk traditionally borne by investors. As a result, the accuracy of the indices commonly used to measure borrowing costs was further eroded.

6/ General obligation bonds are backed unconditionally by the issuing government's general revenues or, if these prove insufficient, by the full taxing power of the jurisdiction. Revenue bonds, the other major category of tax-exempt debt, depend on a specific and limited revenue source, such as highway tolls, for the funds needed to repay principal and interest.

7/ For a description of some of the creative financing techniques popular at the beginning of the decade, see (11).

Credit Enhancements, Ratings, and Interest Rates

While most of the more exotic creative financing techniques were available only to large governments and agencies borrowing for private purposes, credit enhancements were becoming more commonplace among all types of governments in 1982 (11). Private insurance and State guarantees tend to lower borrowing costs by reducing default risk on principal and interest payments (over specified portions of the issue's life) should the issuer become insolvent. Since bond rating analysts and bond investors may assign different values to bond enhancements, they often drive a wedge between a bond's rating and the market's perception of its creditworthiness. This wedge distorted the traditional relationship between bond ratings and interest rates during 1982. Table 1 presents this relationship.

In 1982, Moody's credit ratings did not reflect the presence of private insurance; Standard and Poor's Corporation (S&P), the other major firm rating municipal bonds, assigned its highest rating, AAA, to bonds insured by the American Municipal Bond Assurance Corporation (AMBAC) or the Municipal Bond Insurance Association (MBIA). Thus, Moody's ratings were invariably

Table 1--Relationship between the average interest cost for local government general obligation bonds and Moody's and/or Standard and Poor's credit ratings

Credit rating		Local government general obligation bonds			
		Total		Uninsured bonds	
Moody's	S&P	Issues	Interest	Issues	Interest
		Number	Percent	Number	Percent
Aaa	AAA	363	10.35	64	9.47
Aa	AA, AA+/-	312	9.73	312	9.73
A-1	A+	234	10.05	234	10.05
A	A, A-	371	10.09	371	10.09
Baa-1	BBB+	118	10.84	118	10.84
Baa	BBB, BBB-	68	11.18	68	11.18
Unrated		707	10.44	707	10.44

Note: Bonds are categorized according to the highest rating received from the rating agencies. Since S&P awarded AAA ratings to MBIA- and AMBAC-insured issues, the Aaa rating category includes insured issues which received a lower or no rating from Moody's in 1982. Average net interest cost is based on all bond issues for which financial, geographic, and socioeconomic information is available.

Source: All tables in this report are constructed from data provided in the Public Securities Association's 1982 long-term municipal bond file, as amended by the authors.

lower than S&P's for bonds insured by these two companies.8/ In addition, the two rating firms do not always agree on the creditworthiness of uninsured bond issues. A bond issue having two different ratings is not uncommon, although differences of more than one rating category are comparatively rare for uninsured issues. In table 1, each bond issue is classified on the basis of the highest rating received from the two rating agencies. Thus, the Aaa category includes all MBIA- and AMBAC-insured issues, together with bonds which received an Aaa rating on their own merit from either Moody's or S&P's.

Moody's analysts have contended that insured bonds are generally perceived to be less creditworthy than bonds which receive an Aaa rating without enhancements. Thus, the presence of insured bonds within the Aaa rating category may be one reason Aaa-rated bonds paid higher interest rates, on average, than bonds with lower ratings (those with Aa, A-1, and A ratings) in 1982. The difference between what the credit rating agencies formally include in the ratings process and the perception of risk reduction in the market leads to interest costs that differ for instruments with the same rating, obscuring the relationship between credit ratings and interest costs. Additional credit support, such as the FmHA three-tiered interest subsidy scheme, also distorts the interest costs that would have been generated by the market.

As a control for the effect of credit enhancements on interest costs, the last column of table 1 presents the relationship between credit ratings and interest for all issues which had no insurance. The monotonic increase in interest costs as credit ratings decline supports the traditional perception of the relationship between the two variables. This table also suggests the degree of confusion introduced by the presence of enhancements. Empirical analyses of municipal bonds which do not adequately control for credit enhancements are likely to suffer from increasingly severe specification error as these enhancements become more commonplace.

Importance of Timing

The second major characteristic of the municipal bond market of 1982 that deserves special attention is related to the significant changes in market interest rates during the year. The Moody's composite rate for 20-year reoffering yields for selected GO bonds was 13.14 in January; it fell to 9.8 in October and closed the year at 10.06 (8). The timing of the bond sale significantly affects interest costs and causes apparent distortions in the relationship between credit ratings and interest rates. During high interest rate periods, only the most creditworthy governments can afford to borrow for public-purpose capital projects. Thus, the simple correlation coefficient between credit ratings, assuming a continuous rating scale, and interest rates would tend to be low when observations reflect widely different market conditions. When market rates are taken into account, however, a clear relationship between ratings and borrowing costs emerges: high ratings significantly reduce borrowing costs.

8/ In 1984, Moody's changed its policy and began awarding Aaa ratings to MBIA-insured issues. Moody's, however, continues to ignore the presence of AMBAC insurance when it assigns a rating because of legal and financial problems with AMBAC's parent company.

STATE AND REGIONAL BOND ISSUE CHARACTERISTICS

Much of the previous literature on local government borrowing costs has been based on national samples, abstracting local governments from their State and regional environment. The potential effects of State rules, regulations, and financial practices on the creditworthiness of individual local governments may be obscured in a national analysis. In an effort to understand the role States play in determining the characteristics of municipal bonds issued in 1982, a State-by-State analysis of general obligation and revenue bond issues has been undertaken.

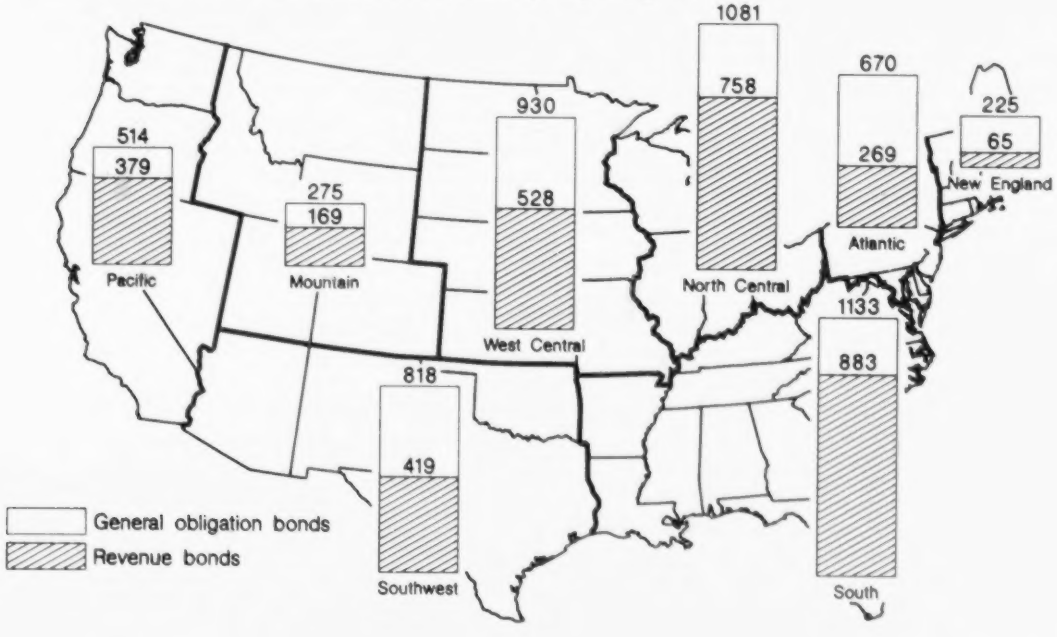
Type of Security

Figure 1 summarizes the relative importance of revenue and GO bond activity in 1982 for each region of the country. The present dominating role of revenue bonds in the tax-exempt bond market is apparent from the regional distributions. The relative importance of revenue bonds is apparent even though our data excludes industrial development revenue bonds.

The general use of GO's seems to be most prevalent in New England, where they constitute 71 percent of local government issues. The total amount of bond activity, in terms of the number of issues, however, is relatively small in New England. Even though the proportionate amount of GO activity is lowest in the South, because of its size, significantly more GO's were issued in the South than in several other regions, including New England.

The striking regional differences support the view that similarities in government practices in adjoining States might make regional subsets

Figure 1
Local Government Debt Issuance Activity, By Region, 1982



preferable to nationwide samples in any empirical analysis of local government borrowing costs. While an appreciation of the regional differences in bond activity is an important first step, regional differences might still mask what is more important. Regional groups might reveal State similarities, but the operative unit is the State. The State government sets financial guidelines for its local jurisdictions and determines tax limits and fiscal responsibilities. The ability to borrow, and the way a local government enters the bond market, are affected by State laws, regulations, and customs.

Table 2 presents the distribution of 1982 bond issues for individual States. Borrowing activity and the relative share of revenue and GO bonds vary dramatically by State. The total number of local government bond issues varied from a low of 4 in Hawaii to a high of 580 in Texas. When the number of issues is adjusted for the State's population size, some degree of regional homogeneity appears. Nonetheless, bond-issuing activity still ranges from 0.40 issue per 100,000 people in Hawaii to 10.85 issues per 100,000 people in North Dakota.

There is some regional homogeneity in total borrowing activity, but it virtually disappears when the components of borrowing are examined separately for States within each region. For example, among the Southern States, GO bonds are as little as 1 percent of the total in Kentucky, while they constitute 60 percent of South Carolina's bond issues. Caution must be exercised when comparing bond issue characteristics among individual States, since the absolute amount of issues varies dramatically among States. For example, Arkansas, Delaware, Georgia, Hawaii, Kentucky, Nevada, and West Virginia collectively sold only 15 GO bond issues in 1982. At the other end of the activity spectrum, local governments in Texas issued 281 GO bonds.

State governments create the rules and regulations which local governments must follow when issuing bonds. These rules may involve such procedural activities as the use of specific formulas to rank underwriter bids on competitively sold bonds. State differences may also involve more complicated legislative rules, such as those associated with Proposition 13 in California. The recent increase in the use of a variety of enhancement mechanisms can be affected by State policies and programs as well. Several States guarantee all or part of select local government bond issues through a variety of mechanisms, some of which essentially make the local debt a State responsibility.9/ To various degrees, local creditworthiness begins to take on the character of the parent State government, for good, as in the case of Texas (before the fall in oil prices), or ill, as in New Hampshire.

The wide variation within and among the regions implies an equally wide variety of local government financing practices. The considerable difference among the States suggests that State practices may affect local activities. Tables 3 and 4 present selected variables that may affect local government borrowing costs on a regional and State-by-State basis. The data indicate that bond characteristics differ widely among the regions and States. The data also show that these characteristics differ between GO and revenue bond issues as well.

9/ State laws and regulations also influence the types of private sector enhancements and other creative financing techniques local governments may use. See (4).

Table 2—Distribution of general obligation and revenue bond issues, by region and State

Region and State	All bonds		GO bonds		Revenue bonds	
	Total	Per 100,000 population	Total	Percentage of total	Total	Percentage of total
	Number			Percent	Number	Percent
New England	**225**	**1.82**	**160**	**71.1**	**65**	**28.9**
Connecticut	64	2.06	53	82.8	11	17.2
Maine	24	2.11	7	29.2	17	70.8
Massachusetts	85	1.48	64	75.3	21	24.7
New Hampshire	17	1.79	11	64.7	6	35.3
Rhode Island	15	1.57	11	73.3	4	26.7
Vermont	20	3.86	14	70.0	6	30.0
Atlantic	**670**	**1.61**	**401**	**59.7**	**269**	**40.3**
Delaware	8	1.33	4	50.0	4	50.0
Maryland	55	1.29	23	41.8	32	58.2
New Jersey	199	2.69	177	89.8	22	10.2
New York	196	1.12	147	75.0	49	25.0
Pennsylvania	212	1.78	50	23.6	162	76.4
North Central	**1,081**	**2.59**	**323**	**29.8**	**758**	**70.2**
Illinois	293	2.55	152	51.9	141	48.1
Indiana	123	2.24	36	29.3	87	70.7
Michigan	243	2.67	27	11.1	216	88.9
Ohio	275	2.55	27	9.8	248	90.2
Wisconsin	147	3.09	81	55.1	66	44.9
West Central	**930**	**5.41**	**402**	**43.2**	**528**	**56.8**
Iowa	281	9.13	97	34.5	184	65.5
Kansas	82	3.40	43	52.4	39	47.6
Minnesota	307	7.41	159	51.8	148	48.2
Missouri	88	1.78	15	17.0	73	83.0
Nebraska	77	4.84	40	51.9	37	48.1
North Dakota	73	10.85	40	54.8	33	45.2
South Dakota	22	3.16	8	36.4	14	63.6
South	**1,133**	**2.14**	**250**	**22.1**	**883**	**77.9**
Alabama	85	2.15	10	11.8	75	88.2
Arkansas	43	1.87	2	4.7	41	95.3
Florida	191	1.82	10	5.2	181	94.8
Georgia	176	3.12	5	2.8	171	97.2
Kentucky	101	2.74	1	1.0	100	99.0
Louisiana	99	2.26	36	36.4	63	63.6
Mississippi	42	1.64	16	38.1	26	61.9
North Carolina	62	1.03	36	58.1	26	41.9
South Carolina	88	2.74	53	60.2	35	39.8
Tennessee	125	2.69	53	42.4	72	57.6
Virginia	82	1.50	27	30.7	55	69.3
West Virginia	39	1.99	1	2.6	38	97.4

—Continued

Table 2—Distribution of general obligation and revenue bond issues, by region and State—Continued

Region and State	All bonds: Total	All bonds: Per 100,000 population	GO bonds: Total	GO bonds: Percentage of total	Revenue bonds: Total	Revenue bonds: Percentage of total
	Number			Percent	Number	Percent
Southwest	**818**	**3.82**	**399**	**48.7**	**419**	**51.3**
Arizona	99	3.42	40	40.4	59	59.6
New Mexico	59	4.32	36	61.0	23	39.0
Oklahoma	80	2.49	42	52.5	38	47.5
Texas	580	3.80	281	48.4	299	51.6
Mountain	**275**	**4.18**	**106**	**38.5**	**169**	**61.5**
Colorado	146	4.76	58	39.7	88	60.3
Idaho	9	0.92	6	66.7	3	33.3
Montana	40	4.98	11	27.5	29	72.5
Utah	53	3.39	19	35.8	34	64.2
Wyoming	27	5.31	12	44.4	15	55.6
Pacific	**514**	**1.57**	**135**	**26.2**	**379**	**73.8**
Alaska	25	5.64	12	48.0	13	52.0
California	292	1.19	24	9.0	268	91.0
Hawaii	4	0.40	1	25.0	3	75.0
Nevada	15	1.71	1	6.7	14	93.3
Oregon	78	2.92	66	84.6	12	15.4
Washington	100	2.33	31	31.0	69	69.0
United States	**5,646**	**2.49**	**2,176**	**38.5**	**3,470**	**61.5**

Note: Includes all local government bond issues for which financial and geographic information is available.

Basis for Awards

Most local governments do not attempt to directly market their bonds to the investing public. Instead, the entire issue is sold to an underwriting firm, which then resells the securities in the bond issue to investors. State law often requires that the underwriter offering the lowest interest cost in a competitive sale be awarded the issue. Two predominant methods of calculating interest costs on competitively awarded bonds are net interest cost (NIC) and true interest cost (TIC).10/ The NIC measure is an average of the coupon rates for each bond in the issue. Until recently, NIC was used almost exclusively as the measure of interest costs on municipal bonds. Since NIC ignores the timing of interest payments, however, NIC-based awards

10/ NIC is the sum of the coupon payments that have to be made in each year plus the dollar bid discount, or minus the dollar bid premium, all divided by the appropriate number of bond year dollars. TIC incorporates the time value of money and is the composite yield to maturity of all the bonds in a serial issue. See (5) for a discussion of the differences between these two measures of interest cost.

Table 3—General obligation bond issue characteristics, by region and State

Region and State	GO bond issues: Total	Awarded by NIC	Insured	Unrated	Competitive Sale	Callable
	Number	Percent				
New England	**160**	**86**	**19**	**21**	**91**	**51**
Connecticut	53	98	32	23	88	30
Maine	7	100	0	0	86	43
Massachusetts	64	73	11	19	97	55
New Hampshire	11	91	0	27	100	55
Rhode Island	11	100	55	9	100	91
Vermont	14	79	0	43	57	79
Atlantic	**401**	**51**	**29**	**12**	**88**	**48**
Delaware	4	50	25	25	75	100
Maryland	23	96	13	0	96	91
New Jersey	177	38	23	13	99	29
New York	147	46	35	13	99	44
Pennsylvania	50	86	42	14	16	100
North Central	**323**	**96**	**10**	**42**	**90**	**63**
Illinois	152	99	16	43	81	53
Indiana	36	100	5	19	95	42
Michigan	27	93	14	50	96	82
Ohio	27	74	4	59	100	56
Wisconsin	81	98	0	44	99	84
West Central	**402**	**99**	**0**	**52**	**88**	**80**
Iowa	97	99	0	65	98	68
Kansas	43	100	2	47	100	42
Minnesota	159	99	0	38	94	89
Missouri	15	100	0	40	93	60
Nebraska	40	100	0	95	12	100
North Dakota	40	100	0	48	95	95
South Dakota	8	88	0	63	88	100
South	**250**	**95**	**6**	**24**	**87**	**87**
Alabama	10	100	20	40	30	10
Arkansas	2	50	0	0	100	100
Florida	10	50	50	20	90	100
Georgia	5	100	0	0	80	60
Kentucky	1	100	0	0	100	100
Louisiana	36	100	11	22	97	97
Mississippi	16	100	0	50	100	44
North Carolina	36	100	0	50	64	100
South Carolina	53	100	0	9	98	75
Tennessee	53	96	8	26	94	91
Virginia	27	78	4	0	78	96
West Virginia	1	100	0	100	100	0

—Continued

Table 3--General obligation bond issue characteristics, by region and State--Continued

Region and State	GO bond issues: Total	Awarded by NIC	Insured	Unrated	Competitive Sale	Callable
	Number	Percent				
Southwest	**399**	**100**	**17**	**33**	**97**	**78**
Arizona	40	100	20	1	100	47
New Mexico	36	100	3	56	100	75
Oklahoma	42	100	0	95	95	86
Texas	281	100	21	28	97	84
Moutain	**106**	**97**	**7**	**44**	**41**	**82**
Colorado	58	96	7	47	20	89
Idaho	6	100	0	50	100	83
Montana	11	91	0	64	73	82
Utah	19	100	16	37	63	79
Wyoming	12	100	8	50	50	50
Pacific	**135**	**94**	**10**	**34**	**88**	**89**
Alaska	12	92	38	0	85	38
California	24	100	12	71	54	99
Hawaii	1	0	50	0	100	100
Nevada	1	100	0	100	100	100
Oregon	66	95	0	36	97	98
Washington	31	100	16	16	94	84
United States	**2,176**	**83**	**13**	**33**	**88**	**71**

Note: Includes all local government bond issues for which financial and geographic information is available. The bond issue characteristics represent the percentage of issues which were: (1) awarded on the basis of lowest net interest cost; (2) insured by MBIA or AMBAC; (3) not rated by both Moody's and S&P; (4) awarded through competitive bidding rather than private placement or negotiations with underwriters; and (5) sold with some provision for early repayment.

can result in higher real interest costs when the timing of the payments is taken into consideration. To rectify this shortcoming, the TIC measure of interest cost, which takes the timing of interest rate payments into account, was developed and has grown in popularity. Nonetheless, even though evidence indicates that the use of NIC is often inefficient and may ultimately lead to higher total borrowing costs, some States still mandate the use of NIC rather than TIC.

The Atlantic region, with only 51 percent of all GO issues awarded on the basis of NIC, is significantly different from the rest (table 3). As is evident from the State data, within the Atlantic region, New York and New Jersey are the dominant TIC States. In the remaining regions, only Massachusetts in New England and Virginia in the South have a significant number and proportion of their GO issues awarded on the basis of TIC.

Table 4—Revenue bond issue characteristics, by region and State

Region and State	Revenue bond issues: Total	Awarded by NIC	Insured	Unrated	Competitive Sale	Callable
	Number	Percent				
New England	**65**	**46**	**11**	**29**	**32**	**75**
Connecticut	11	45	27	18	45	82
Maine	17	24	0	24	47	76
Massachusetts	21	33	5	43	10	71
New Hampshire	6	100	0	17	83	33
Rhode Island	4	50	75	25	0	100
Vermont	6	100	0	33	17	100
Atlantic	**269**	**47**	**7**	**42**	**6**	**94**
Delaware	4	100	25	50	100	100
Maryland	32	53	9	28	16	88
New Jersey	22	23	14	36	5	86
New York	49	39	4	47	8	98
Pennsylvania	162	49	6	45	4	95
North Central	**758**	**54**	**12**	**56**	**52**	**88**
Illinois	141	35	13	60	36	91
Indiana	87	62	16	28	40	91
Michigan	216	79	22	61	72	88
Ohio	248	42	5	58	50	82
Wisconsin	66	48	2	67	39	98
West Central	**528**	**50**	**2**	**66**	**27**	**95**
Iowa	184	27	1	85	25	97
Kansas	39	36	18	44	18	87
Minnesota	148	77	3	39	28	93
Missouri	73	41	1	64	29	96
Nebraska	37	78	0	92	16	100
North Dakota	33	42	0	73	58	100
South Dakota	14	93	0	100	0	71
South	**883**	**52**	**10**	**50**	**19**	**95**
Alabama	75	75	75	75	75	97
Arkansas	41	66	2	61	7	89
Florida	181	53	22	36	15	94
Georgia	171	44	4	37	15	97
Kentucky	100	68	1	64	29	95
Louisiana	63	68	19	25	37	92
Mississippi	26	35	8	31	12	100
North Carolina	26	50	0	54	8	100
South Carolina	35	54	6	37	11	94
Tennessee	72	46	6	64	26	92
Virginia	55	49	5	58	5	96
West Virginia	38	37	5	61	5	95

—Continued

Table 4—Revenue bond issue characteristics, by region and State—Continued

Region and State	Revenue bond issues: Total	Awarded by NIC	Insured	Unrated	Competitive Sale	Callable
	Number	Percent				
Southwest	**419**	**66**	**9**	**24**	**42**	**93**
Arizona	59	65	23	23	35	95
New Mexico	23	43	9	35	35	74
Oklahoma	38	53	8	47	36	97
Texas	299	69	7	20	45	93
Mountain	**169**	**57**	**6**	**47**	**13**	**93**
Colorado	88	51	6	49	8	93
Idaho	3	33	66	33	0	100
Montana	29	68	9	77	55	100
Utah	34	65	6	26	6	94
Wyoming	15	60	0	40	0	73
Pacific	**379**	**65**	**20**	**35**	**36**	**92**
Alaska	13	75	42	17	42	83
California	268	65	24	34	35	93
Hawaii	3	33	66	0	33	66
Nevada	14	71	29	21	21	93
Oregon	12	58	0	33	42	100
Washington	69	65	0	45	41	88
United States	**3,470**	**55**	**10**	**48**	**31**	**92**

Note: Includes all bond issues for which financial and geographic information is available. The bond issue characteristics represent the percentage of issues which were: (1) awarded on the basis of lowest net interest cost; (2) which were insured by MBIA or AMBAC; (3) not rated by both Moody's and S&P; (4) awarded through competitive bidding rather than private placement or negotiations with underwriters; and (5) sold with some provision for early repayment.

NIC is less pervasive as the basis for awarding revenue bonds (table 4). Nationally, the proportion of revenue bonds awarded on the basis of NIC approximates the lowest regional proportion for GO bonds. Not only are NIC-based awards less pervasive in the revenue bond market, the regional distinctions are far less obvious. Thus, the mix of revenue and GO bonds, combined with the mix of NIC- and TIC-awarded bonds, can create unique bond market characteristics in each State.

Credit Ratings and Enhancements

A second factor which could affect the relative cost of borrowing is the presence of a bond rating provided by one or both of the major rating services. Tables 3 and 4 show the proportion of new issues which were not rated by either S&P or Moody's, the two rating agencies dominating the municipal bond market. This group of bonds is referred to as unrated

throughout the remainder of this report. While 33 percent of the GO bonds and 48 percent of the revenue bonds were unrated nationally, the regional breakdowns show much variation, particularly in the GO bond market. As in the case of the distribution of NIC-awarded issues, the Atlantic States had the lowest incidence of unrated bonds, with all but 12 percent of their GO issues rated by at least one of the major rating firms. In contrast, more than half of the GO issues in the West Central region were unrated.

Examination of table 4 reveals higher proportions of unrated bonds in the revenue bond market for all regions but the Southwest and less variation among the regions. When the State distribution is viewed, the range widens for both GO and revenue issues. In the case of the GO issues, the percentage unrated reaches 100 only for States with very few issues. The only significant borrowers, in terms of numbers of issues, with high proportions of unrated bonds were Nebraska and Iowa, where 92 and 85 percent were unrated. The variance of the proportion of unrated issues may suggest the presence or absence of State rules or regulations regarding bond ratings. The variance could also signify the presence or absence of bond enhancements, which could also affect the final net borrowing costs to local governments.

The column labeled "insured" indicates the presence of MBIA or AMBAC insurance guaranteeing payment of principal and interest in the event of a default by the issuing government. Nationally, GO bonds were slightly more likely to be insured than revenue bonds. The proportion of insured GO bond issues varies from less than 1 percent in the West Central region to 29 percent in the Atlantic region. For revenue bond issues, the proportion insured varied from 2 percent in the West Central to 20 percent in the Pacific region.

For States that issued at least 50 GO bonds, the percentage insured ranged from 0 in Iowa, Oregon, Minnesota, South Carolina, and Wisconsin to 42 in Pennsylvania. Using the same minimum cutoff for revenue bonds, the percentage insured went from 0 in Washington to 75 in Alabama. This wide variation among States again suggests that State practices affect municipal bond activity.

Type of Sale and the Use of Call Provisions

The last bond characteristics included in tables 3 and 4 are the type of placement the bond received (that is, competitive bidding versus negotiated sale) and the presence of call provisions. The literature is somewhat vague about the exact effect on borrowing costs of awarding an issue through competitive bidding versus negotiated placements with underwriters (6). State regulations often require the use of a competitive sale on the assumption that competition holds down borrowing costs. Recent evidence, however, suggests that, under certain conditions, a negotiated sale may be cheaper. Whether cost effective or not, the wide variation in the use of competitive bidding by region should be noted and taken into account in any analysis.

The proportion of new GO bond issues placed through competitive bidding varied from 41 percent in the Mountain States to 97 percent in the Southwest. For revenue bonds, the range is 6 percent in the Atlantic States to 52 percent for the North Central States. Competitive bidding may be related to local government responsibilities and scope of authority and, as such, State rules and regulations may generate these results. Revenue bonds are less

likely to come under State procedural rules and are often sold by agencies removed from individual governments, giving issuers more flexibility in the practice of placing these bonds.

In New York and New Jersey, 99 percent of the GO bonds were placed through competitive bidding. In the Southwest, the State with the lowest percentage of issues placed through competitive bidding was Oklahoma, where 95 percent of the issues were competitively placed on the basis of NIC bids from underwriters. The percent of revenue bonds awarded on a competitive basis, for States with more than 50 issues, varied from 4 in Pennsylvania to 75 in Alabama.

The presence of provisions which enable the issuing government to repay bonds before maturity, generally after a specified date and often with some prestated premium, are known as call features. During 1982, these provisions were quite common due to relatively high interest rates. While their incidence does not vary as dramatically by region and State, discernible differences still exist. Call features are present in 75 percent of the revenue bonds issued in New England (the region with the lowest percent), and in 95 percent of the revenue bonds in the West Central region and the South. The range for GO bond issues is from 48 percent in the Atlantic region to 89 percent in the Pacific region. The use of call features among States with at least 50 GO issues ranged from 29 percent in New Jersey to 100 percent in Pennsylvania. For States which had at least 50 revenue bond issues, call features were in 82 percent of the bonds issued in Ohio and in 98 percent of those issued in Wisconsin. Nationally, 92 percent of all revenue bonds issued in 1982 contained some kind of call feature.

The above discussion and the information presented in the preceding tables suggest substantial State and regional differences in the types of bonds issued, the issuing mechanisms relied on, and the use of credit ratings and enhancement. These State differences could have profound effects on local government borrowing costs, and any study of the relative costs of funds for rural governments should account for these factors.

STRUCTURE OF ISSUING GOVERNMENTS

One can better understand the nature of the local government bond market and the State's role in indirectly shaping the market by examining borrowing activity by government type. Table 5 presents the distribution of bond issues, both GO and revenue, by type of issuer within each region. Table 5 reveals the variety of governmental arrangements within the United States. The absence of county activity in New England is offset by considerable town activity. Municipal governments dominate the borrowing picture in the West Central region. County governments borrow more often in the South than in any other region, though still not as often as municipal governments.

Table 5 indicates that school district activity is not uniformly distributed across regions. Active school districts are found in the Atlantic, North Central, South, Southwest, and Mountain regions. School districts accounted for 55 percent of the GO bonds issued in the Southwest in 1982 and for only 6 percent of GO's issued in New England. A similar pattern holds for special district borrowing. These unique governments are most active in the GO market in the Southwest and Mountain States.

Table 5—Distribution of local government bond issues within regions, by type of issuing government

Region	Bond issues	Bond issues sold by: County	Municipality	Town	Special district	School district
	Number	Percent				
GO bonds:						
New England	160	0.7	35.7	54.5	3.5	5.6
Atlantic	401	16.8	33.7	15.6	1.8	32.2
North Central	323	8.6	46.3	2.4	9.5	33.2
West Central	402	9.8	74.6	.3	4.3	11.1
South	250	30.7	37.7	0	2.6	29.0
Southwest	399	8.4	13.4	0	23.4	54.8
Mountain	106	8.3	30.3	0	28.4	33.0
Pacific	135	12.8	59.4	0	10.5	15.8
Revenue bonds:						
New England	65	0	21.1	18.4	21.1	0
Atlantic	269	16.1	24.6	1.7	56.8	0
North Central	758	33.8	49.1	6.3	9.2	1.6
West Central	528	5.3	84.4	0	9.3	1.0
South	883	37.9	46.2	0	14.1	0
Southwest	419	20.6	64.4	0	13.9	.4
Mountain	169	33.3	56.6	0	10.0	0
Pacific	379	13.6	69.0	0	16.7	.4

Note: Includes all bond issues for which financial and geographic information is available. Type of government is based upon determinations made by the Governments Division of the U.S. Bureau of the Census.

Table 5 reveals the same basic regional dissimilarities for revenue bonds as for GO bonds, though the types of governments involved in the revenue bond market are different. The most striking difference between the revenue and GO bond markets is the virtual absence of school districts in the revenue bond market. Since revenue bonds are generally project-specific and linked to some anticipated flow of revenues, the absence of school districts is not unexpected. The emergence of special districts as an important agent across all regions in the revenue bond market should not be surprising. The very nature of special districts is to produce services for single governments with debt-limit restrictions or to act as agents for groups of local governments where externalities make coordinated action mutually advantageous, making special districts an ideal vehicle for revenue bond financing. The project-specific nature of revenue bonds, combined with the uncertain geographic and political boundaries of the issuer, makes any comprehensive analysis of their borrowing cost exceedingly difficult.

Revenue bond activity is generally a county or municipal function in most regions, with the exception of the Atlantic region where special districts play a major role. The unique governmental structure in New England is again apparent from the role town governments play in issuing revenue bonds. The role of specific government types in the borrowing process may reflect underlying government structure, the end use of funds, or the inability of

local governments to market GO bonds because of debt limits or declining creditworthiness. Whatever the reason, significant levels of variation among the regions are related to the type of debt instrument employed and the type of governments issuing these instruments.

RURAL CHARACTERISTICS

In this section, several factors, which could affect local government borrowing costs, are analyzed on the basis of the issuer's rurality. Rural classifications are based on the proportion of the local jurisdiction's population the 1980 census reported as rural. Based on the percentage of the local population classified as rural, bond issuers were grouped into one of six classes of governments. The classes were defined as:

Rural Group 0 - 2 percent or less rural	(N=2,702)
Rural Group 1 - greater than 2 but not over 20 percent rural	(N=379)
Rural Group 2 - greater than 20 but not over 40 percent rural	(N=231)
Rural Group 3 - greater than 40 but not over 60 percent rural	(N=184)
Rural Group 4 - greater than 60 but not over 80 percent rural	(N=148)
Rural Group 5 - greater than 80 percent rural	(N=254)

These classes place issuing governments into mutually exclusive groups. Before analyzing variations in bond issue characteristics, we will describe the types of issuers falling into each of these rural categories.

Borrower Characteristics

Table 6 shows the population, income, and metropolitan characteristics of the general purpose and school district governments that issued debt in 1982, by degree of rurality.11/ As expected, the more urban governments are those with the largest populations and the highest per capita incomes. The only surprise occurs in the relative position of the two least-rural catagories. The 3- to 20-percent rural category has a higher average population and per capita income than the most urban group. This is a reflection, in part, of the number of smaller sized communities with populations greater than 2,500 people (and, therefore, counted as urban) outside of metropolitan areas. Nonmetropolitan communities generally have lower income levels and smaller populations than metropolitan communities. Over 14 percent of the issuing governments in the most urban category are nonmetropolitan, compared with 9 percent for the 3- to 20-percent rural group. The nonmetropolitan percentage continuously increases throughout the remainder of the rural categories.

The population of the 3- to 20-percent rural group is also affected by multiple issues from some very large counties in this group, especially Los Angeles County. Unlike municipalities, county governments are likely to serve relatively large populations, with sizable rural components. Data on counties, therefore, is presented separately in the lower half of table 6.

The relative importance of rural governments in the municipal bond market, in terms of the number of bonds issued in 1982, varies among regions and by type

11/ The lack of specific information on the geographic boundaries of many special districts makes it extremely difficult to collect socioeconomic information for these units of government.

Table 6—Socioeconomic characteristics of local governments issuing long-term bonds, by degree of rurality

Rural percentage of issuer's population	Average population, 1980	Average per capita income, 1979	Inside a metropolitan area, 1980
	Number	Dollars	Percent
All governments:			
2 percent or less	156,377	7,723	85.4
Greater than 2 but not over 20 percent	401,097	7,918	91.6
Greater than 20 but not over 40 percent	99,564	7,368	64.9
Greater than 40 but not over 60 percent	51,304	6,611	42.4
Greater than 60 but not over 80 percent	35,389	6,164	25.0
Over 80 percent	11,347	6,027	23.2
County governments:			
2 percent or less	1,572,733	8,558	100.0
Greater than 2 but not over 20 percent	651,540	8,004	99.5
Greater than 20 but not over 40 percent	162,077	7,308	67.2
Greater than 40 but not over 60 percent	71,318	6,587	40.5
Greater than 60 but not over 80 percent	42,045	5,969	12.0
Over 80 percent	25,969	5,863	17.5

Note: Includes general-purpose governments and school districts that issued one or more long-term bonds during 1982. Averages are based on data for each government each time it entered the bond market in 1982 and, therefore, give extra weight to frequent issuers. Special districts are excluded because of the lack of socioeconomic data on most special district governments.

of bond. Table 7 shows the distribution of local government borrowing within each region and class of issue among the six rural categories defined earlier. During 1982, rural governments were most active relative to urban governments in the South, Southwest, New England, and Atlantic regions for GO bond issues. In the revenue bond market, rural governments were relatively active in the South, North Central, and Mountain regions.

Types of Issuing Governments

Underlying the differences in regional bond activity is the difference in the structure of local government among the regions. Table 8 shows the distribution of bond issues within each rural category and class of issue, by type of government. Appendix tables 1 and 2 present a more detailed analysis of borrowing by government type, by region, by rural classification and indicate substantial regional differences in these characteristics.

Table 7—Distribution of local government bond issues within regions, by degree of rurality

Region	Rural percentage of issuer's population					
	0 - 2	3 - 20	21 - 40	41 - 60	61 - 80	over 80
	Percent					
GO bonds:						
New England	58.7	17.5	11.2	7.0	4.2	1.4
Atlantic	59.6	15.1	8.3	4.5	5.5	7.0
North Central	73.3	5.6	8.9	2.4	1.5	8.3
West Central	80.9	4.0	3.8	1.8	2.0	7.6
South	48.9	6.4	9.9	12.0	15.9	6.9
Southwest	51.3	13.4	8.0	6.4	3.3	17.7
Mountain	66.4	11.2	5.6	6.5	.9	9.4
Pacific	78.2	9.8	3.8	3.0	1.5	3.8
Revenue bonds:						
New England	87.0	8.7	4.4	0	0	0
Atlantic	83.5	8.7	1.7	2.6	.9	2.6
North Central	64.3	8.5	6.1	7.0	6.3	7.8
West Central	94.7	1.3	.4	2.2	0	1.3
South	62.2	14.3	5.4	7.1	6.0	5.1
Southwest	81.3	13.6	3.6	1.2	.4	0
Mountain	67.8	10.0	7.8	5.6	4.4	4.4
Pacific	88.3	7.8	2.0	2.0	0	0

Note: Includes all bond issues for which financial, geographic, and socioeconomic information is available.

The GO bond market, in many ways, reflects the shape of local government, which varies regionally (table 5) and with the rural nature of the government (table 8). County government is a major borrower in the mid-range rural groupings; that is, from 3- to 80-percent rural. In the two extremes, 2-percent or less rural and greater than 80-percent rural, counties are less important. In the case of the most urban places, the dominant form of government in the GO bond market is the municipality. Since most municipalities are categorized as either totally rural or totally urban, their importance within the most urban category is to be expected. For the most rural places, over 85 percent of GO bond issues were sold by school districts. School districts accounted for more bond issues in every group but the most urban. The importance of school district borrowing is somewhat obscured by the presence of fiscally dependent school districts throughout the Northeast and in Maryland, North Carolina, Virginia, and Tennessee, as well as variations in State-local responsibilities for school construction. Special districts appear to play a relatively important role in GO borrowing in the most urban areas; their importance within the other rural categories cannot be determined based on available data.

The revenue bond market differs substantially from the GO bond market, in that rather than reflecting government functions, it indicates the existence of special problems, special arrangements, or special projects. Thus, counties dominate for all but the most urban governments, where municipalities and special districts are the most common borrowers (table 8).

Table 8—Distribution of local government bond issues within rural classifications, by type of issuing government

Rural percentage of issuer's population	Bond issues sold by: County	Municipality	Town	Special district	School district
			Percent		
GO bonds:					
2 percent or less	2.3	63.3	5.1	15.2	14.2
3-20 percent	33.6	4.2	17.5	0	44.7
21-40 percent	34.6	.6	12.4	0	52.5
41-60 percent	38.5	0	10.1	0	51.4
61-80 percent	42.1	0	7.4	0	50.5
Over 80 percent	13.4	0	1.0	0	85.6
Revenue bonds:					
2 percent or less	2.1	75.0	1.8	20.7	.4
3-20 percent	88.3	6.2	4.9	0	.6
21-40 percent	95.7	1.5	2.9	0	0
41-60 percent	98.7	0	1.3	0	0
61-80 percent	98.1	0	0	0	1.9
Over 80 percent	90.0	0	3.3	0	6.7

Note: Includes all bond issues for which financial, geographic, and socioeconomic information is available. Type of government is based on determinations made by the Governments Division of the U.S. Bureau of the Census. The total absence of special districts for most rural categories is due to the lack of socioeconomic information on these types of governments.

School districts are virtual nonparticipants in the revenue bond market, and municipalities and special districts are absent from all but the most urban category. The relative importance of school districts in the GO market and their absence from the revenue bond market may have some effect on analyses of the cost of borrowing by type of government and, therefore, must by taken into account.

Bond Issue Characteristics

GO bond issues exhibit no simple linear relationships between variables most often viewed as determinants of bond prices and, thus, interest costs and the rurality of the issuing governments (table 9). The bond issues of distinctly urban governments were not significantly different from the most rural governments in terms of the percentage: using NIC as the basis of competitive awards, containing call features and insurance enhancements, and awarding by competitive bidding. The only marked difference between highly urban and highly rural issues is the higher proportion of rural issues not rated by either of the major bond rating agencies. When the same bond characteristics are analyzed for revenue bonds, the percentage of competitively sold and the percentage of unrated are directly related to the issuing government's rurality. No other discernible patterns are apparent.

Table 9—Characteristics of local government bond issues, by degree of rurality

Rural percentage of issuer's population	Bond issues	Issues				
		Awarded by NIC	Insured	Unrated	Competitive sale	Callable
	Number	Percent				
GO bonds:						
2 percent or less	1,396	89.3	13.0	35.2	87.8	71.4
3-20 percent	217	84.3	19.8	11.1	91.7	57.1
21-40 percent	162	87.0	13.0	25.3	92.0	64.2
41-60 percent	109	89.9	16.5	27.5	97.2	77.1
61-80 percent	95	88.4	11.6	27.4	91.6	72.6
Over 80 percent	194	89.7	12.9	48.5	83.5	74.2
Revenue bonds:						
2 percent or less	1,306	92.6	12.3	34.3	44.5	89.1
3-20 percent	162	93.2	13.0	21.6	32.1	89.5
21-40 percent	69	97.1	20.3	27.5	44.9	82.6
41-60 percent	75	93.3	14.7	37.3	48.0	86.7
61-80 percent	53	92.5	17.0	37.7	56.6	83.0
Over 80 percent	60	96.7	16.7	50.0	63.3	95.0

Note: Includes all bond issues for which financial, geographic, and socioeconomic information is available. The bond issue characteristics represent the percentage of issues: (1) awarded on the basis of lowest net interest cost; (2) which were insured by MBIA or AMBAC; (3) not rated by both Moody's and Standard and Poor's; (4) awarded through competitive bidding rather than private placement or negotiations with underwriters; and (5) sold with some provision for early repayment.

Credit Ratings and Rurality

In addition to whether an issue is rated or not, borrowing costs will vary inversely with the rating received. More favorable ratings tend to increase the market for a bond issue, lower investor concerns regarding default risk and, therefore, lower borrowing costs. Table 10 presents the distribution of rated GO and revenue bonds within each rural category by the issue's Moody's and/or S&P credit rating. As in table 1, bonds are classified according to the highest rating they receive from the two rating firms. To partially adjust for the role insurance plays in determining the highest rating, a special category, Aaa-I, is included for bonds receiving an AAA rating from S&P because of the presence of MBIA or AMBAC insurance.

General obligation issues vary widely in the proportion of issues rated. Table 9 presents the distribution of rated versus nonrated issues. The most rural governments had the highest proportion of bonds unrated. The 3- to 20-percent rural group had the lowest proportion of bonds unrated. Of the GO bonds that were rated, the highest proportion of Aaa- and Aa-rated bonds were in the 3- to 20-percent rural category, possibly reflecting the higher proportion of strong counties in this category (table 10). Similarly, the lowest proportion of Aaa- and Aa-rated bonds were in the most rural groups. At the other end of the

Table 10—Distribution of rated local government bond issues within rural classifications, by Moody's and/or Standard and Poor's credit rating.

Rural percentage of issuer's population	Rated issues	Rating catagories: Aaa	Aaa-I	Aa	A-1	A	Baa-1	Baa
	Number	Percent						
GO bonds:								
2 percent or less	904	4.7	20.0	24.8	16.6	23.5	6.9	3.7
3-20 percent	193	8.8	22.3	26.4	13.5	22.3	6.2	.5
21-40 percent	121	2.5	17.4	16.5	24.8	29.8	7.4	1.7
41-60 percent	79	2.5	22.8	8.9	13.9	35.4	12.7	3.8
61-80 percent	69	0	15.9	7.3	14.5	43.5	13.0	5.8
Over 80 percent	100	0	25.0	5.0	7.0	22.0	16.0	25.0
Revenue bonds:								
2 percent or less	858	10.8	18.7	20.4	14.8	27.7	3.7	3.9
3-20 percent	127	22.8	16.5	20.5	22.1	15.8	1.6	.8
21-40 percent	50	12.0	28.0	10.0	8.0	38.0	0	4.0
41-60 percent	47	8.5	23.4	12.8	23.4	25.5	2.1	4.3
61-80 percent	33	12.1	27.3	15.2	15.2	9.1	12.1	9.1
Over 80 percent	30	6.7	33.3	16.7	13.3	13.3	13.3	3.3

Note: Includes all bond issues rated by Moody's Investors Service or Standard and Poor's Corporation for which financial, geographic, and socioeconomic information is available. Bonds are categorized according to the highest rating they received from the rating agencies (see table 1 for information on how the S&P rating categories compare with the Moody's rating categories). Bonds receiving an Aaa rating because of MBIA or AMBAC insurance are classified as Aaa-I bonds to distinguish them from those rated Aaa on their own merits.

rating spectrum, the most rural governments sold a much higher proportion of Baa-rated issues than any other group.

The low proportion of GO bonds rated Aaa and Aa among highly rural governments and the high proportion rated Baa and Baa-1 partially reflects the dominance of school districts in this group of borrowers. School districts, regardless of region or rurality, have very few Aaa ratings on their uninsured bond issues. The lack of favorable ratings reflects the tendency for school districts to be dominated by State policies, prescriptions, and aid flows to a greater degree than other forms of government. Also, the tendencies for school districts to rely on narrow revenue bases, to be small relative to other governments, and to depend on voter approval of yearly budgets may reduce creditworthiness.

The distribution of unrated revenue bonds has much less variance than was evident for GO bonds, ranging from 22 to 50 percent (table 9). The lower half of table 10 shows the distribution of rated revenue bonds within each rural category, by each issue's credit rating. Unlike GO bonds, the highest concentration of Aaa- and Aa-rated revenue bonds is in the most rural category, reflecting the popularity of private bond insurance among this group of issuers. When Aaa-I ratings are ignored, the more rural categories tend to have lower proportions of favorably rated bond issues, but the differences among groups are small in comparison to those in the GO bond market. As was

the case with GO's, Baa and Baa-1 ratings are more highly concentrated in the more rural groups, with the 61- to 80-percent rural category having the highest concentrations of these ratings in the revenue bond market. The exclusion of most special districts due to the absence of rurality measures may obscure the actual urban-rural distribution of ratings in the revenue bond market. Furthermore, the absence of school districts as borrowers in the revenue bond market makes direct comparisons between the distributions of ratings on GO and revenue bond issues of questionable value.

The inclusion of MBIA- and AMBAC-insured bonds in the Aaa-rated category tends to obscure the pattern of ratings based on the creditworthiness of local governments. Ignoring the class of bond issues given the Aaa-I rating in table 10 only partially adjusts for the distortions introduced into the rating process by private insurance and other credit enhancements. To get a better picture of how bonds are rated based on the creditworthiness of the issuer, table 11 presents the distribution of Moody's ratings. In 1982, Moody's ignored the presence of bond insurance and awarded ratings based solely on their judgment of the bond issue's creditworthiness.12/ A comparison of tables 10 and 11 highlights the effect private insurance had on bond ratings in 1982. For all categories of governments, a lower proportion of bonds were favorably rated by Moody's (table 11), than by S&P. For GO bond issues, the differences between tables 10 and 11 are greatest for the most rural governments, indicating the importance of insurance to these governments.

Based on table 11, Moody's ratings on GO bonds drop precipitously as the issuer's rurality increases beyond the 20-percent level. Highly rural governments evidently do not possess the qualities municipal analysts associate with creditworthiness. Interestingly, this does not appear to be the case for revenue bonds. The revenue bond rating process, which keys on project-specific revenues, differs from the GO bond rating process. As a result, even highly rural issuers have a good chance of receiving favorable ratings on their revenue bonds.

Table 11 also indicates the percentage of rated bond issues which had their ratings raised or lowered by Moody's during 1982. In the GO bond market, highly rural issuers had their ratings raised or lowered less frequently than other issuers during the year. State fiscal and financial conditions can lead to changes in the creditworthiness of all of a State's local governments, in varying degrees. The extent to which these Statewide changes explain the pattern of changes by degree of rurality is difficult to determine due to the wide variation in State-local fiscal relations.

In the revenue bond market, rating changes (primarily reductions) seem to be more common among rural places. The mixed governments, where the rural percentage of the population ranges from 21 to 40 percent, had issues that had been downrated by Moody's significantly more often than any other group. This pattern is due to the presence of multiple issues from three counties in Michigan and one county in Florida which were downrated by Moody's during 1982. Again, the effects of Statewide changes are difficult to determine, as

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12/ This overstates the purity of Moody's ratings somewhat. Moody's took government guarantees and other forms of credit enhancements into account in their credit evaluations in 1982. These enhancements, however, tend to be far less prevalent than private bond insurance.

Table 11—Distribution of rated local government bond issues within rural classifications, by Moody's credit rating

Rural percentage of issuer's population	Bonds rated by Moody's as: Aaa	Aa	A-1	A	Baa-1	Baa	Rating changed: Up	Down
	Percent							
GO bonds:								
2 percent or less	3.9	24.0	21.8	31.6	11.5	7.2	5.4	9.8
3-20 percent	8.8	24.9	19.3	32.0	12.2	2.8	6.6	6.6
21-40 percent	1.7	16.5	26.1	38.3	15.7	1.7	10.4	6.1
41-60 percent	1.3	9.2	19.7	38.2	27.6	4.0	9.2	7.9
61-80 percent	0	6.6	14.8	50.8	18.0	9.8	1.6	1.6
Over 80 percent	0	2.3	9.2	20.7	27.6	40.2	3.4	1.1
Revenue bonds:								
2 percent or less	6.3	15.1	23.0	39.0	10.6	6.0	5.5	9.3
3-20 percent	18.5	16.1	37.0	23.5	4.9	0	7.4	12.3
21-40 percent	7.1	14.3	10.7	46.4	14.3	7.1	14.3	75.0
41-60 percent	7.7	3.9	34.6	42.3	3.9	7.7	0	23.1
61-80 percent	21.1	21.1	21.1	21.1	15.8	0	0	0
Over 80 percent	13.3	26.7	26.7	0	26.7	6.7	0	20.0

Note: Includes all bond issues rated by Moody's Investors Service for which financial, geographic, and socioeconomic information is available. The Aaa rating category does not reflect the presence of MBIA or AMBAC insurance. The rating change columns indicate the percentage of rated issues within each rural category that had ratings increased or decreased by Moody's during 1982.

is the degree of rurality of special districts, a major revenue bond issuer, but a change in ratings is neither purely an urban nor rural phenomenon.

RURAL GOVERNMENT BORROWING COSTS: A MODEL

The average net interest cost for long-term bonds sold by local governments within each of our rural categories is reported in table 12. For GO bonds, governments in the 3- to 40-percent rural range paid the lowest interest rates, on average, for debt issued in 1982. The most rural category paid the highest average rate, followed closely by the most urban. Just the opposite pattern holds for the revenue bond market, although differences in average interest rates among the rural categories are smaller than those reported for the GO bond market.13/

Average interest costs do not really indicate the reception given to rural municipal bond issues by investors in 1982. The preceding sections have identified several bond issue and issuer characteristics which the literature

13/ The terms "net interest cost," "interest cost," "borrowing cost," and "interest rate" are used interchangeably in this section. The terms all refer to the government's interest cost (either NIC or TIC, expressed as a rate of interest) on its municipal bond issues.

Table 12--Average interest costs for local government bond issues, by degree of rurality

Rural percentage of issuer's population	Average interest cost on:		
	GO bonds	Revenue bonds	All bonds
	Percent		
2 percent or less	10.36	11.15	10.74
3-20 percent	9.88	11.26	10.47
21-40 percent	9.85	11.11	10.23
41-60 percent	10.08	11.10	10.50
61-80 percent	10.25	11.21	10.59
Over 80 percent	10.46	11.02	10.60

Note: Includes all bond issues for which financial, geographic, and socioeconomic information is available. In most cases, interest cost is expressed as NIC, the average rate of interest for all the bonds in an issue.

has linked to local government borrowing costs. Many of these characteristics vary regionally, by State, and by degree of rurality. In addition, general credit market conditions varied dramatically during the year covered by this report. All of these factors should be taken into account before any conclusion about the differential borrowing costs of rural governments can be reached. To this end, a standard model from the finance and tax literature is used to determine the effects of the earlier mentioned characteristics on the borrowing costs of local governments, and the specific costs associated with predominantly rural governments.

The following econometric analysis employs a basic model which has been a common part of the literature on local government borrowing costs for a number of years. In a previous analysis of 1977 bond sales, Sullivan used a similar estimating procedure to identify the differential effects of bond ratings on the NIC of municipal bonds sold by small governments (14). More recently, Kidwell, Koch, and Stock employed a similar approach in an attempt to identify the effect State tax codes have on the NIC of funds borrowed by local governments (7).

The model includes those factors associated with municipal bond market conditions, bond issue characteristics, and the circumstances of the issuing governments. Ordinary least squares (OLS) multivariate regression equations are used to measure variations in the NIC of public-purpose issues sold by local governments in 1982.

The basic equation hypothesizes that interest cost is a function of several independent variables:

NIC = f[RATE,RATEC,NBID,YRMAT,COMP,CALL,TERM,TIC,TYPE,MRAT,CHRAT, SCHL,POP80,POP2,PCI79,NMET,RURAL,STATE]

where:

NIC = the net interest cost of NIC-awarded issues or the true interest cost of TIC-awarded issues;

RATE = the arithmetic mean of the Moody's composite yields for 20-year average maturity bonds rated Aaa, Aa, A, and Baa, during the week of sale;
RATEC = the change in RATE over the preceding 2 weeks (8);
NBID = the number of bids received on competitively awarded issues;
YRMAT = the number of years to final maturity;
COMP = a dummy variable set equal to 1 for competitively awarded issues, and to 0 for negotiated or privately placed issues;
CALL = a dummy variable, where 1 indicates the presence of call provisions;
TERM = a dummy variable that equals 1 when the issuance is a term bond (that is, an issue with a single maturity) and 0 for a serial issue;
TIC = a dummy variable that equals 1 when the basis of awards was TIC and 0 when the basis of award was NIC;
TYPE = a set of dummy variables for special types of revenue bonds where:
HOSP equals 1 for hospital revenue bonds, and
HOUSE equals 1 for housing revenue bonds.
MRAT = Moody's credit rating in dummy variable form, with:
AAA equal to 1 if the issue is rated Aaa,
AAAI equal to 1 if the issue is insured by MBIA,
AA equal to 1 if the issue is rated Aa or Aa-1,
A equal to 1 if the issue is rated A or A-1,
BAA equal to 1 if the issue is rated Baa or Baa-1,
NORAT equal to 1 if the issue is not rated by either Moody's or S&P.
The excluded set includes all non-MBIA-insured issues rated by S&P, but not by Moody's.
CHRAT = Moody's rating changes in dummy variable form, where:
UPRAT equals 1 when the issuing government's rating was raised during 1982, and
DNRAT equals 1 when the issuing government's rating was lowered during 1982.
SCHL = a dummy variable, where 1 indicates the issuer was an independent school district;
POP80 = Population in 1980 (including census estimates for school districts);
POP2 = POP80 squared;
PCI79 = per capita income in 1979 (including census estimates for school districts);
NMET = a dummy variable that equals 1 when the issuing government was not located in an SMSA, as defined in 1980;
RURAL = the proportion of the population classified as rural in the 1980 census, in dummy variable form, where:
RURAL1 equals 1 if the proportion rural was greater than 2 but less than or equal to 20 percent,
RURAL2 equals 1 if the proportion rural was greater than 20 but less than or equal to 40 percent,
RURAL3 equals 1 if the proportion rural was greater than 40 but less than or equal to 60 percent,
RURAL4 equals 1 if the proportion rural was greater than 60 but less than or equal to 80 percent,
RURAL5 equals 1 if the proportion rural was greater than 80 percent.
The excluded group contains those governments whose rural population was less than 2 percent of the total population.
STATE = a set of dummy variables for the most active States in the municipal bond market in 1982, including: New Jersey (NJ), New York (NY), Illinois (IL), Minnesota (MN), and Texas (TX). The remaining States are the excluded group.

The expected signs, in general, follow from the literature. NIC is expected to be lower for term bonds, reflecting long-term uncertainty in the municipal bond market during a period of high inflation. The NIC is also expected to decline as the number of bids increases because a high degree of underwriter competition should result in lower borrowing costs. The NIC is expected to rise as the bond issue's maturity structure (measured by YRMAT) increases because longer term bonds are usually more difficult to sell during inflationary periods. Bonds callable before their maturity date, recently downrated bonds, bonds issued by independent school districts, and certain types of revenue bonds are expected to have higher interest rates because of the added risks associated with these characteristics.14/ Recently uprated bonds, bonds sold by larger communities, and bonds sold by wealthy communities (measured by per capita income) are expected to have lower interest rates because of their lower risks.15/ Competitively awarded issues should tend to have lower NIC's than bonds sold through negotiation, and TIC-awarded issues should paradoxically pay higher nominal interest rates than NIC-awarded issues.16/

National market conditions are measured by the market rate of interest and the change in this rate over the preceding 2 weeks to capture the effect market volatility might have on underwriter bids. Both should be positively related with NIC. The sign for MRAT indicates whether bond ratings have an effect on the interest cost of government borrowing. The excluded group, in this case, is comprised of non-MBIA-insured bonds which were rated by S&P but not by Moody's during 1982. This set was chosen as the excluded group in an attempt to minimize the effects of S&P ratings on the estimating equation. To further minimize the effects of dual ratings, all MBIA-insured bonds were assigned an AAAI rating by the authors.17/ In 1984, Moody's rated bonds that

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14/ The rating change variables indicate whether Moody's changed the issuer's rating during 1982. This change may have occurred before, after, or concurrent with the bond sale being analyzed. The signs of the rating change coefficients, therefore, reflect the market's anticipation in some instances and the market's reaction in other instances.

15/ To test for the possibility of a nonlinear relationship between NIC and community size, the population variable raised to the second power enters the equation. If rates first decline as population size increases, then begin to climb beyond some optimal population size, the squared term should be positively related with NIC.

16/ While reliance on NIC to award competitively sold issues can result in higher real borrowing costs than would result with TIC awards, data allowing direct comparison between these two measures is not generally available. The PSA reports whichever measure of interest cost was used to award the issue. As a result, when TIC- and NIC-awarded issues are grouped together, the NIC-awarded issues may appear to have lower borrowing costs, other things being equal, because their interest variable does not reflect true interest cost.

17/ The Moody's ratings on AMBAC-insured bonds were not recoded to AAAI for two reasons. First, Moody's has never considered AMBAC insurance when it rates a bond issue, so recoding the ratings for AMBAC-insured issues cannot be justified on the basis of current practices, as it can for MBIA-insured bonds. Second, the market treated the two insurance programs differently in 1982. AMBAC-insured bonds sold at higher rates than MBIA-insured bonds, other things being equal.

were insured by MBIA as credit-enhanced issues, awarding them Aaa ratings as S&P had done for some time. While this was not the practice in 1982, to account for the market's acceptance of insurance, the original Moody's ratings were replaced with the special AAAI rating for all MBIA-insured bond issues for this analysis. Bonds rated AAA, AA, and possibly AAAI are expected to have lower interest costs than the average of all issues rated only by S&P, which serve as the excluded group. Some ratings obviously will have higher interest costs than the excluded group. The sign and relative size of the coefficient for the AAAI variable indicate the interest cost savings which existed if the bond was insured by MBIA in 1982. Given the size of the sample, the coefficients indicate the degree to which the rating groups differ from the excluded group and the amount they differ from each other. The average S&P rating for bonds in the excluded group changes as the samples change, so care should be taken when comparing the rating coefficients from different tables.

To determine the relative advantage or disadvantage associated with rurality, the degree of rurality of the issuing government enters the equation as a series of dummy variables. The excluded group is comprised of all urban places (2 percent or less rural). In addition, a nonmetropolitan location dummy variable is included to further refine our understanding of differential borrowing costs. To correct for possible State anomalies, a series of dummy variables, identifying those States which issued large numbers of municipal bonds, enters certain equations.

Tables 13, 14, 15, and 16 present the regression results. Table 13 reports OLS estimates for the GO bond issues of all governments in the sample. The only difference between the two equations reported in this table is the presence of a series of dummy variables to indicate a high degree of activity in the GO bond market by governments within certain States. Table 14 follows the same format, excluding school districts from the sample.

Table 15 presents revenue bond information. Again, the estimating equations exclude, then include the State activity dummy variables. Since school districts dominate the most rural group of governments issuing long-term debt in 1982, they are analyzed as a separate group. Table 16 presents equations for all fiscally independent school districts which borrowed money in the GO bond market in 1982.

General Obligation Bonds

Table 13 shows the results of the OLS regressions for GO bond issues. The signs of the coefficients generally match those hypothesized. Of the variables with coefficients significantly different from zero, only the sign of the population-size coefficient is unexpected. Interest costs on GO bonds were positively related with government size in 1982. The squared value of population, to identify nonlinearity in the relationship, was negative but not significantly different from zero at the 5-percent level.

Of some surprise is the lack of statistical significance for the dummy variables indicating the existence of call provisions and TIC-based awards; similarly, the cost of term bonds was not significantly different from that of serial issues. The effect of a credit rating increase during 1982 on borrowing costs has the expected negative sign, and indicates a 28-basis-point reduction in interest costs. Rating reductions did not appear to increase borrowing costs over and above their impact via the credit rating

Table 13—Regression equations for explaining interest costs on newly issued general obligation bonds, 1982

Independent variables	Variable name	Equation 1 Coefficient	Equation 1 t-value	Equation 2 Coefficient	Equation 2 t-value
Constant	—	38.41	1.41	37.76	1.42
Market interest rate	RATE	.84	49.73	.83	50.35
2-week change in rate	RATEC	.31	7.73	.28	7.26
Number of bids received	NBID	-6.09	4.79	-5.35	4.35
Years to final maturity	YRMAT	11.25	25.41	11.99	27.35
Competitive sale dummy	COMP	-51.45	6.37	-49.16	6.27
Call provision dummy	CALL	3.57	.78	3.75	.81
Term bond dummy	TERM	-8.54	.57	-5.22	.36
TIC-award dummy	TIC	-4.21	.67	5.16	.71
Moody's credit rating:					
Aaa	AAA	-105.40	5.78	-100.91	5.73
Aaa (MBIA-insured)	AAAI	-23.37	1.61	-14.67	1.03
Aa	AA	-71.94	4.96	-72.55	5.17
A or A-1	A	-25.03	1.81	-20.01	1.50
Baa or Baa-1	BAA	54.13	3.71	58.78	4.11
Unrated	NORAT	-15.38	1.11	-10.90	.81
Rating change dummy:					
Rating raised in 1982	UPRAT	-28.30	2.81	-30.75	3.10
Rating lowered in 1982	DNRAT	4.85	.57	13.06	1.58
School district dummy	SCHL	15.62	3.08	15.92	3.08
Population size	POP80	3.86E-5	3.40	4.28E-5	3.87
Population size squared	POP2	-3.59E-12	1.52	-3.77E-12	1.65
Per capita income	PCI79	-3.21E-3	2.59	-4.64E-3	3.76
Nonmetropolitan dummy	NMET	-10.59	1.96	-10.01	1.91
Rurality dummy:					
3-20 percent rural	RURAL1	-26.16	4.08	-25.39	4.09
21-40 percent rural	RURAL2	-18.23	2.55	-20.92	3.03
41-60 percent rural	RURAL3	-18.38	2.14	-18.07	2.18
61-80 percent rural	RURAL4	-6.00	.65	-4.39	.49
Over 80 percent rural	RURAL5	-13.99	1.73	-15.01	1.91
Major State issuer dummy:					
Illinois	IL	—	—	33.96	4.03
Minnesota	MN	—	—	-22.67	2.60
New Jersey	NJ	—	—	23.88	2.78
New York	NY	—	—	-61.58	7.16
Texas	TX	—	—	5.48	.74
R (adjusted)		.71		.73	
F-ratio		145.50		134.89	
Number of observations		1,505		1,505	
Interest (mean)		1,009.14		1,009.14	

—Indicates that State variables were not included in equation 1.
Note: Interest rates (NIC, RATE, and RATEC) are measured in basis points (hundredths of a percent). The excluded group from the credit rating series is comprised of all non-MBIA-insured issues which were rated by S&P but not by Moody's. For these two equations, the average S&P rating and interest cost for the excluded group was AA and 10.449 percent.

itself. Governments located outside metropolitan areas received a 10-point reduction in interest cost, all other things remaining constant, while school districts paid higher rates than other forms of local government.

The lack of significance for the dummy variables indicating MBIA insurance (AAAI) and Moody's A ratings suggest that, on average, they have interest costs no different from the group of issues rated only by S&P. Governments selling bonds with a Moody's rating of Baa or Baa-1 paid significantly higher interest costs than did those issuing higher rated issues and those issuing bonds rated only by S&P. Of some surprise, however, is the finding that unrated bonds paid rates equivalent to the excluded group (which had an "average" S&P rating of AA).

The size of the coefficient for MBIA-insured bonds relative to the coefficients for Aa- and Aaa-rated bond issues confirms our suspicion that, despite their AAA ratings from S&P, investors make a distinction between insured issues and favorably rated uninsured issues. Other things being equal, MBIA-insured bonds sold at rates roughly equivalent to bonds rated A and A-1 by Moody's during 1982.

The implications of the coefficients for the rural group dummy variables suggest that the effect of rurality on interest costs is not linear. Net interest costs increase as the rural proportion of the population increases from 3 to 60 percent, though they are lower than those paid by the most urban governments. The coefficients of the remaining two groups, 61- to 80-percent and greater than 80 percent, are not significantly different from zero. The least costly degree of rurality is 3-20 percent. Issuers in that group paid rates 26 basis points lower than the most urban issuers, with governments in the 21-60 percent rural range paying rates roughly 18 basis points lower than urban issuers. FmHA subsidies possibly have their greatest effect in the most rural groups. Their presence might lead to a nonmarket-related reduction of interest cost for the most rural governments, obscuring differences between urban and rural governments. FmHA subsidies, combined with the number of small urban places, could explain the lack of distinction between the borrowing costs of the most urban and the most rural governments.18/

When the same model was estimated with State dummies inserted to identify States active in the bond market, very few coefficients changed significantly. In the model including State dummy variables, the coefficient for the nonmetropolitan dummy variable is not different from zero at the 5-percent level of significance. All of the other significant coefficients maintained the same sign and roughly the same values in both versions of the model. Based on the State dummy variables, governments in New York and Minnesota paid significantly lower interest costs than did others, while governments in Illinois and New Jersey paid higher rates on their GO bond issues.

Table 14 presents OLS estimates for the GO bonds sold by local governments excluding school districts. The OLS results for these two samples of GO bond issues differ significantly. In table 14, the coefficients for the term bond

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18/ Based on OLS regression results when urban places with populations less than 15,000 were included in the equation as a separate category, small urban issuers did not pay significantly higher interest rates than larger urban issuers of GO bonds during 1982.

and TIC-award dummy variables are significantly different from zero, while the coefficients for per capita income and the 41-60 percent rural group are not different from zero at the 5-percent level of significance. As anticipated, call features add to borrowing costs, while term bonds cost less to sell than serial bonds. Of more interest is the consistent significance of the nonmetropolitan dummy variable among nonschool issuers and the more rapid drop-off in interest rate savings as rurality increases.

Table 14 indicates that suburban-type nonschool governments (those 3-40 percent rural) pay lower costs than do urban and rural issuers. Nonschool borrowers located outside metropolitan areas pay lower rates, other things being equal, while highly rural governments (over 40-percent rural for nonschool governments) pay rates equivalent to the most urban issuers.

Revenue Bonds

Table 15 reports the results of OLS regressions for all local government revenue bonds issued in 1982. The principal differences in these equations, when compared with the estimates reported in table 13, involve the lack of significance for several variables significant in the GO bond model and the increased importance of other variables as determinants of interest costs on revenue bonds.

The dominant factors determining interest costs on revenue bonds are the market interest rate, recent changes in this rate, the number of years to maturity, the credit rating, the term versus serial structure of the bond, the number of bids received, and the type of sale. Bonds issued to finance the construction of hospital facilities and housing paid significantly higher rates than other types of revenue bonds. The metropolitan location, rurality, population size, and per capita income of the issuing government, and the use of TIC-based awards seem to be unrelated to the interest cost of local government revenue bonds.

The complete lack of significant coefficients for the socioeconomic variables probably reflects the project-specific nature of the revenue bond market. With the exception of governments in the 41-60 percent rural category, location, size, and the general wellbeing of the community are relatively unimportant to revenue bond underwriters and investors. This lack of statistical significance is striking when compared with the OLS regression coefficients found for GO bonds, where socioeconomic factors were important determinants of borrowing costs.

The other major difference between the two markets is the effect the lack of a credit rating has on borrowing costs. In the GO bond market, unrated bonds paid rates equivalent to A-rated bonds. In the revenue bond market, unrated issues paid rates significantly higher than A-rated bonds, although not as high as Baa-rated bonds. This may reflect the relative importance of having an independent appraisal of a bond's creditworthiness when the security pledged as repayment is project-specific.

The State dummy variables exhibit markedly different patterns in tables 13 and 15. In the revenue bond market, the big winners seem to be governments in New Jersey, and, to a lesser extent, New York and Texas. Recall that in the GO bond market, New Jersey governments paid significantly higher interest costs than did issuers in other States.

Table 14—Regression equations for explaining interest costs on general obligation bonds sold by local governments other than school districts, 1982

Independent variables	Variable name	Equation 1 Coefficient	Equation 1 t-value	Equation 2 Coefficient	Equation 2 t-value
Constant	—	-6.22	.18	-18.01	.53
Market interest rate	RATE	.85	42.03	.85	43.47
2-week change in rate	RATEC	.31	6.24	.31	6.41
Number of bids received	NBID	-6.74	4.49	-5.62	3.87
Years to final maturity	YRMAT	10.42	19.37	11.20	21.13
Competitive sale dummy	COMP	-49.69	4.66	-48.80	4.74
Call provision dummy	CALL	14.48	2.55	15.50	2.69
Term bond dummy	TERM	-39.31	2.18	-33.17	1.91
TIC-award dummy	TIC	2.54	.34	-.75	.09
Moody's credit rating:					
Aaa	AAA	-87.61	3.68	-86.64	3.79
Aaa (MBIA-insured)	AAAI	-3.06	.14	-.54	.03
Aa	AA	-51.44	2.41	-54.78	2.67
A or A-1	A	-12.96	.62	-10.40	.52
Baa or Baa-1	BAA	60.41	2.69	62.95	2.90
Unrated	NORAT	13.32	.63	18.09	.89
Rating change dummy:					
Rating raised in 1982	UPRAT	-40.06	3.19	-51.86	4.14
Rating lowered in 1982	DNRAT	11.13	1.20	21.09	2.35
Population size	POP80	4.10E-5	3.49	4.35E-5	3.75
Population size squared	POP2	-4.02E-12	1.68	-4.10E-12	1.76
Per capita income	PCI79	-1.01E-3	.63	-2.21E-3	1.40
Nonmetropolitan dummy	NMET	-16.26	2.26	-14.61	2.11
Rurality dummy:					
3-20 percent rural	RURAL1	-39.51	4.89	-33.55	4.28
21-40 percent rural	RURAL2	-32.06	3.47	-35.42	3.97
41-60 percent rural	RURAL3	-11.80	1.05	-10.89	1.01
61-80 percent rural	RURAL4	1.21	.10	3.47	.29
Over 80 percent rural	RURAL5	13.73	.89	12.24	.82
Major State issuer dummy:					
Illinois	IL	—	—	35.46	2.75
Minnesota	MN	—	—	-27.01	3.02
New Jersey	NJ	—	—	31.35	3.30
New York	NY	—	—	-61.24	5.70
Texas	TX	—	—	22.95	1.92
R (adjusted)		.73		.75	
F-ratio		103.63		96.65	
Number of observations		947		947	
Interest (mean)		1,004.04		1,004.04	

—Indicates that State variables were not included in equation 1.
Note: Interest rates (NIC, RATE, and RATEC) are measured in basis points (hundredths of a percent). The excluded group from the credit rating series is comprised of all non-MBIA-insured issues rated by S&P but not by Moody's. For these two equations, the average S&P rating and interest cost for the excluded group was AA+ and 10.023 percent.

Table 15—Regression equations for explaining interest costs on newly issued revenue bonds, 1982

Independent variables	Variable name	Equation 1 Coefficient	Equation 1 t-value	Equation 2 Coefficient	Equation 2 t-value
Constant	—	208.46	5.49	209.12	5.52
Market interest rate	RATE	.77	29.91	.77	29.92
2-week change in rate	RATEC	.41	7.31	.40	7.08
Number of bids received	NBID	-12.85	4.46	-11.80	4.05
Years to final maturity	YRMAT	6.92	15.16	7.07	15.48
Competitive sale dummy	COMP	-49.10	4.72	-50.98	4.91
Call provision dummy	CALL	19.96	1.94	22.04	2.15
Term bond dummy	TERM	-78.17	9.95	-77.50	9.88
TIC-award dummy	TIC	2.22	.18	-.84	.07
Type of issue dummy:					
Hospital revenue bond	HOSP	75.72	6.81	72.87	6.57
Housing revenue bond	HOUSE	39.49	3.42	39.44	3.42
Moody's credit rating:					
Aaa	AAA	-130.76	7.31	-123.65	6.85
Aaa (MBIA-insured)	AAAI	-14.53	1.05	-19.76	1.41
Aa	AA	-52.62	3.78	-49.97	3.54
A or A-1	A	-13.83	1.40	-14.50	1.46
Baa or Baa-1	BAA	73.50	4.63	71.97	4.52
Unrated	NORAT	38.41	4.08	36.33	3.84
Rating change dummy:					
Rating raised in 1982	UPRAT	-39.09	2.13	-35.81	1.94
Rating lowered in 1982	DNRAT	8.14	.64	7.44	.58
Population size	POP80	8.81E-6	.83	6.99E-6	.66
Population size squared	POP2	-8.37E-13	.45	2.13E-13	.11
Per capita income	PCI79	-4.03E-3	1.75	-3.59E-3	1.53
Nonmetropolitan dummy	NMET	-1.34	.15	-2.49	.28
Rurality dummy:					
3-20 percent rural	RURAL1	-5.14	.53	-6.16	.63
21-40 percent rural	RURAL2	-18.60	1.35	-21.00	1.53
41-60 percent rural	RURAL3	-38.66	2.88	-40.35	3.01
61-80 percent rural	RURAL4	-8.33	.51	-11.71	.71
Over 80 percent rural	RURAL5	-21.40	1.38	-21.94	1.42
Major State issuer dummy:					
Illinois	IL	—	—	-33.52	1.49
Minnesota	MN	—	—	-22.71	1.71
New Jersey	NJ	—	—	-254.91	2.41
New York	NY	—	—	-83.12	2.01
Texas	TX	—	—	-21.27	1.98
R (adjusted)		.56		.56	
F-ratio		56.22		48.46	
Number of observations		1,188		1,188	
Interest (mean)		1,118.05		1,118.05	

—Indicates that State variables were not included in equation 1.
Note: Interest rates (NIC, RATE, and RATEC) are measured in basis points (hundredths of a percent). The excluded group from the credit rating series is comprised of all non-MBIA-insured issues rated by S&P but not by Moody's. For these two equations, the average S&P rating and interest cost for the excluded group was AA- and 11.430 percent.

School District Bonds

Because school districts were such important players among rural governments issuing bonds in 1982, completely dominating the most rural group, and since school districts generally lack favorable credit ratings regardless of rurality, the basic model was estimated separately based on GO bonds issued by independent school districts. The OLS regression results are reported in table 16. The regression coefficients estimated with the school district sample are different from the coefficients estimated with nonschool GO bonds (table 14) for several variables. As with revenue bonds, nonmetropolitan location, rurality, and population size of the issuing government were not important determinants of school district borrowing costs. Furthermore, the coefficients for the rating change variables and the dummy variables for call features and term bonds were not significantly different from zero in the school bond equation.

Unlike nonschool GO bonds and revenue bonds, the AAAI variable indicates that MBIA-insured school bonds paid significantly lower interest costs than did bonds rated only by S&P. Furthermore, unrated school bonds also paid rates significantly lower than the excluded group, which had an average S&P rating of AA-. The per capita income level of the issuing community was significant and negatively related with interest rates on GO bonds sold by school districts.

Taken together, the importance of local income levels, the unimportance of other socioeconomic variables, and the unique pattern of rating coefficients suggest that school bonds may be sold in more localized markets than nonschool bonds. If school bonds tend to be sold locally, the absence of a rating should not have the same effect on local investors as would the absence of a rating on a major bond issue being marketed nationwide. Higher per capita income, since it indicates a larger potential revenue capacity for the narrow tax base typically relied upon by school districts, should reduce the borrowing costs of school district bonds.

CONCLUSIONS

The differential interest cost to rural governments associated with borrowing in the tax-exempt bond market is a function of the advantageous position of several large partially rural counties, and the dominance of school district borrowing in rural communities, rather than a disadvantage of predominantly rural governments. This conclusion is the result of a number of OLS regression equations estimated from a unique data set generated by the authors in conjunction with the USDA.

This set of 1982 data is unique because it combines socioeconomic, financial, and governmental information. This combination of data has enabled the project researchers to identify every government that entered the municipal bond market in 1982, a year in which interest rates and, therefore, bond prices fluctuated widely. The data set also allowed each government to be identified as being inside or outside of a metropolitan area and by the percentage of the population that conforms to the census definition of rural.

The data base used in this analysis provides the most comprehensive and precise linkage between bond issues and local governments available. This report identifies public-purpose borrowing by general type for

Table 16—Regression equations for explaining interest costs on general obligation bonds sold by school district governments, 1982

Independent variables	Variable name	Equation 1 Coefficient	Equation 1 t-value	Equation 2 Coefficient	Equation 2 t-value
Constant	—	125.74	2.81	126.78	2.89
Market interest rate	RATE	.79	26.61	.79	26.92
2-week change in rate	RATEC	.27	3.90	.20	3.02
Number of bids received	NBID	-6.56	2.80	-6.04	2.67
Years to final maturity	YRMAT	12.10	15.67	12.92	16.85
Competitive sale dummy	COMP	-45.74	3.57	-40.91	3.28
Call provision dummy	CALL	-13.09	1.70	-10.06	1.31
Term bond dummy	TERM	32.93	1.23	26.89	1.04
TIC-award dummy	TIC	-15.65	1.37	15.60	1.11
Moody's credit rating:					
Aaa	AAA	—	—	—	—
Aaa (MBIA-insured)	AAAI	-42.16	2.10	-20.07	1.00
Aa	AA	-89.21	3.88	-78.60	3.55
A or A-1	A	-29.59	1.55	-15.25	.82
Baa or Baa-1	BAA	38.03	1.93	53.44	2.72
Unrated	NORAT	-45.39	2.37	-42.73	2.29
Rating change dummy:					
Rating raised in 1982		-15.30	.92	-10.63	.66
Rating lowered in 1982		.45	.02	-4.33	.22
Population size	POP80	-1.01E-6	.01	-3.62E-5	.37
Population size squared	POP2	5.89E-11	.85	7.54E-11	1.13
Per capita income	PCI79	-6.05E-3	3.00	-8.53E-3	4.28
Nonmetropolitan dummy	NMET	-10.22	1.21	-11.94	1.46
Rurality dummy:					
3-20 percent rural	RURAL1	-4.58	.39	-9.76	.86
21-40 percent rural	RURAL2	1.70	.14	-2.14	.18
41-60 percent rural	RURAL3	-14.00	.95	-15.40	1.09
61-80 percent rural	RURAL4	-2.09	.14	-4.10	.28
Over 80 percent rural	RURAL5	-3.17	.25	-5.26	.42
Major State issuer dummy:					
Illinois	IL	—	—	47.98	4.07
Minnesota	MN	—	—	-7.74	.24
New Jersey	NJ	—	—	28.35	1.49
New York	NY	—	—	-66.89	4.33
Texas	TX	—	—	-7.43	.74
R (adjusted)		.70		.73	
F-ratio		55.92		52.40	
Number of observations		558		558	
Interest (mean)		1,017.79		1,017.79	

—Indicates that State variables were not included in equation 1.
Note: Interest rates (NIC, RATE, and RATEC) are measured in basis points (hundredths of a percent). The excluded group from the credit rating series is comprised of all non-MBIA-insured issues which were rated by S&P but not by Moody's. For these two equations, the average S&P rating and interest cost for the excluded group was AA- and 10.720 percent.

municipalities, counties, towns, special districts, and school districts. The period analyzed is important for several reasons, including the change in the overall credit market, related to the increase in retail activity since 1982. This period also is distinguished by a greater reliance on credit enhancements and credit ratings. A second change since 1982 is related to the erosion of the rural tax base, which was apparent by 1983 and interacts with the present farm crisis.

Of primary importance to rural development policymakers and practitioners is that highly rural governments paid rates roughly equivalent to the most urban borrowers on publicly offered debt issued during 1982. Suburban-type governments benefited from lower interest rates than others on GO bonds sold by nonschool governments, but they had no comparative advantage in issuing revenue bonds or school bonds. Nonschool governments located outside metropolitan areas, as a group, paid lower rates than did their metropolitan counterparts on GO bond issues. Like suburban issuers, nonmetropolitan issuers did not enjoy the same savings on their revenue and school bond sales. According to these results, rural governments were as successful in selling long-term municipal bonds as were urban governments during the volatile market of 1982. Rural interest rates were far from cheap but, given bond characteristics and market conditions at the time of sale, they were comparable to rates paid by urban issuers.

The research presented in the preceeding sections identified patterns of municipal bond finance as they existed in 1982. Many of the patterns which emerged in 1982 are still important factors in the municipal bond market, especially the increased importance of credit enhancements. Those characteristics which vary by State, such as NIC versus TIC as the basis of award, competitive bidding versus negotiated bidding, the overlying government structure, and the fundamental regulations and limitations local governments must observe, are likely to change only slowly over time. Our basic conclusions are, therefore, not likely to be radically altered by recent changes in the bond market.

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Appendix table 1—Distribution of general obligation bonds within rural classifications, by region and type of issuing government

Region and type of issuer	Percentage of issuer's population considered rural					
	0 - 2	3 - 20	21 - 40	41 - 60	61 - 80	over 80
	Percent					
New England:						
Counties	0	0	0	10.0	0	0
Municipalities	60.7	0	0	0	0	0
Towns	29.8	100.0	93.8	80.0	66.7	50.0
Special districts	6.0	0	0	0	0	0
School districts	3.6	0	6.3	10.0	33.3	50.0
Atlantic:						
Counties	2.5	55.0	42.4	27.8	31.8	7.1
Municipalities	56.5	0	0	0	0	0
Towns	15.6	21.7	15.2	16.7	13.7	3.6
Special districts	3.0	0	0	0	0	0
School districts	22.4	23.3	42.4	55.6	54.6	89.3
North Central:						
Counties	2.0	21.1	33.3	25.0	80.0	14.3
Municipalities	62.8	5.3	0	0	0	0
Towns	3.2	0	0	0	0	0
Special districts	13.0	0	0	0	0	0
School districts	19.0	73.7	66.7	75.0	20.0	85.7
West Central:						
Counties	1.3	37.5	66.7	42.9	100.0	26.7
Municipalities	90.7	31.3	0	0	0	0
Towns	.3	0	0	0	0	0
Special districts	5.3	0	0	0	0	0
School districts	2.5	31.3	33.3	57.1	0	73.3
South:						
Counties	7.0	40.0	47.8	78.6	43.2	50.0
Municipalities	73.7	13.3	4.4	0	0	0
Towns	0	0	0	0	0	0
Special districts	5.3	0	0	0	0	0
School districts	14.0	46.7	47.8	21.4	56.8	50.0
Southwest:						
Counties	1.8	27.1	20.6	14.8	14.3	4.0
Municipalities	26.2	0	0	0	0	0
Towns	0	0	0	0	0	0
Special districts	45.9	0	0	0	0	0
School districts	26.2	72.9	79.4	85.2	85.7	96.0
Mountain:						
Counties	0	8.3	16.7	57.1	100.0	10.0
Municipalities	45.1	0	0	0	0	0
Towns	0	0	0	0	0	0
Special districts	43.6	0	0	0	0	0
School districts	11.3	91.7	83.3	42.9	0	90.0
Pacific:						
Counties	4.8	53.9	60.0	25.0	100.0	0
Municipalities	76.0	7.7	0	0	0	0
Towns	0	0	0	0	0	0
Special districts	13.5	0	0	0	0	0
School districts	5.8	38.5	40.0	75.0	0	100.0

Note: Includes all GO bond issues for which financial, geographic, and socioeconomic information is available. Type of government is based upon determinations made by the Governments Division of the U.S. Bureau of the Census. The lack of socioeconomic information for special districts explains their absence from most rural categories.

Appendix table 2—Distribution of revenue bonds within rural classifications, by region and type of issuing government

Region and type of issuer	Percentage of issuer's population considered rural					
	0 - 2	3 - 20	21 - 40	41 - 60	61 - 80	over 80
	Percent					
New England:						
Counties	0	0	0	0	0	0
Municipalities	40.0	0	0	0	0	0
Towns	20.0	100.0	100.0	0	0	0
Special districts	40.0	0	0	0	0	0
School districts	0	0	0	0	0	0
Atlantic:						
Counties	0	100.0	100.0	100.0	100.0	100.0
Municipalities	28.1	0	0	0	0	0
Towns	2.1	0	0	0	0	0
Special districts	69.8	0	0	0	0	0
School districts	0	0	0	0	0	0
North Central:						
Counties	2.6	80.6	96.2	96.7	96.3	84.9
Municipalities	76.3	0	0	0	0	0
Towns	6.2	16.7	3.8	3.3	0	6.1
Special districts	14.2	0	0	0	0	0
School districts	.7	2.8	0	0	3.7	9.1
West Central:						
Counties	.5	100.0	100.0	100.0	0	66.7
Municipalities	89.2	0	0	0	0	0
Towns	0	0	0	0	0	0
Special districts	9.9	0	0	0	0	0
School districts	.5	0	0	0	0	33.3
South:						
Counties	4.3	89.6	94.4	100.0	100.0	100.0
Municipalities	74.2	10.4	5.6	0	0	0
Towns	0	0	0	0	0	0
Special districts	21.5	0	0	0	0	0
School districts	0	0	0	0	0	0
Southwest:						
Counties	.5	97.1	100.0	100.0	100.0	0
Municipalities	80.4	2.9	0	0	0	0
Towns	0	0	0	0	0	0
Special districts	18.6	0	0	0	0	0
School districts	.5	0	0	0	0	0
Mountain:						
Counties	1.6	100.0	100.0	100.0	100.0	100.0
Municipalities	83.6	0	0	0	0	0
Towns	0	0	0	0	0	0
Special districts	14.8	0	0	0	0	0
School districts	0	0	0	0	0	0
Pacific:						
Counties	4.0	80.0	100.0	100.0	0	0
Municipalities	76.7	20.0	0	0	0	0
Towns	0	0	0	0	0	0
Special districts	18.9	0	0	0	0	0
School districts	.4	0	0	0	0	0

Note: Includes all revenue bond issues for which financial, geographic, and socioeconomic information is available. Type of government is based upon determinations made by the Governments Division of the U.S. Bureau of the Census. The lack of socioeconomic information for special districts explains their absence from most rural categories.

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